

REMARKS

Election/Restrictions

Withdrawal by the Examiner of the Election/Restriction of Species filed on September 10, 2004 is acknowledged by the Applicant.

Applicant confirms the election without traverse of claims 1-27 and 29-36 by attorney J. Linderman by phone on January 18, 2005.

Claim 28 is withdrawn from further consideration pursuant to 37 CFR 1.42(b) as being drawn to a non-elected claim.

Claims Rejections 35 USC § 103

Each of the five independent claims presently under consideration, Claims 1, 26, 27, 35 and 36, are rejected under 35 USC § 103(a) as unpatentable over Inagaki, et al (6,737,586) in view of Goss, et al. (4,733,059).

Claim 1 and Claims 2-25, which depend directly or indirectly from Claim 1, have been amended. Consideration of claims 1-25 as amended, and reconsideration of Claims 26, 27 and 29-36, as originally submitted is respectfully requested for the reasons hereinafter set forth.

It is Applicant's contention that the present Office Action fails to establish a prima facie case of obviousness under 35 § 103(a) to support the rejection of any one of the claims under consideration, as originally filed, for reasons hereinafter set forth.

Section 103(a) of our patent statutes requires that the differences between the subject matter sought to be patented and the subject matter of the prior art, as a whole, at the time the invention was made, be determined and that against this background a further determination be made as to whether these differences would have been obvious to a person having ordinary skill in the art to which the subject matter pertains at the time the invention was made. It is applicant's contention that tenets of Section 103(a) are violated by the present office action in that the cited prior art is not considered as a whole and the differences between the subject matter sought to be patented and the subject matter of the prior art is not determined.

This fact is particularly true with regard to the difference between the invention sought to be patented and the primary reference, Inagaki '583, which

difference is not determined but is misrepresented in the present office action as will be hereinafter shown. The differences will now be considered.

The subject matter sought to be patented, as exemplified by claim 1, as originally filed, is an electrical heating element assembly (i.e., an electrical heating cable). The present action acknowledges that Claims 1-27 and 29-36, as originally filed, are drawn to a heating element classified in class 219, subclass 549 (see the present Office Action, page 2 Election/Restrictions paragraph 1). However, Claim 1 is currently amended to further identify the claimed heating element and to set forth its function, i.e. to transform electrical energy applied thereto into heat energy, so that there can be no possible misunderstanding as to the nature of the subject matter being claimed.

The primary reference, Inagaki, et al. '583, as a whole, discloses a flat cable and a manufacturing method therefore. The cable is an electric transmission cable used e.g. for wiring public utility apparatus, office automation apparatus, electronic parts mounted in vehicles, and the like (see Inagaki, column 1, lines 12-14). The disclosure of Inagaki et al '583 is well summarized in the Abstract of Inagaki which reads as follows:

A flat cable includes first and second insulator sheets, and a plurality of conductor elements arranged in parallel relation to one another over the length of the sheets. The first insulator sheet is provided with an adhesive layer. The conductor elements are interposed between the adhesive layer and the second insulator sheet. The first and second insulator sheets are first press-adhered under heat through the adhesive layer, and then bonded by an ultrasonic welding unit. The ultrasonic welding unit includes a horn for importing ultrasonic oscillations, and an anvil placed in opposition to the horn. The first and second insulator sheets are bonded in the zones which extend along the length of the sheets and are located outside the loci where the conductor elements are arranged. The bonding is performed either continuously or in an intermittent manner.

In the office action mailed January 26, 2005, at page 3, paragraph 7, the conductor element 5 of the Inagaki '583 is repeatedly referred to as "the heating element 5". It is further stated in paragraph 7 of the action;

However, Inagaki does not teach a heating element comprises a carbon fiber. Goss teaches an elongated heating cable with a carbon fiber heating element 20. It would have been obvious to one having ordinary skill in the art to modify Inagaki's invention to include a carbon fiber heating element as taught by Goss in order to make the flat heating cable more durable.

The primary reference, Inagaki '583 is not directed to a 'flat heating cable" nor is there any reference to a "heating element" or "heating element 5" in the Inagaki patent. The only reference to "heat" or "heating" found in the Inagaki patent are directed to the processes for manufacturing the Inagaki wiring cable and for scrapping its adhesive layer by burning that layer as part of a recycling process. The Inagaki patent does not contain even a remote suggestion that the flat wiring cable of Inagaki could be used as a heating cable to transform the electrical energy supplied to it into heat energy. Hence, it is applicant's contention that the present office action misrepresents the teaching of the prior art, Inagaki, when properly considered as a whole.

The secondary reference Goss '059 discloses an elongated parallel, constant wattage, heating cable and is described as relating to electrical heating cables that use an electrically resistive heating element in a parallel, constant wattage, zone-type construction. (see Goss "Field of the Invention", column 1, lines 6-10). The Goss heating element is comprised of a carbon, graphite or other non-metallic, conductive filament and has a high tensile strength and can withstand repeated thermal cycling without exhibiting physical or electrical damage. It is described as having an electrical resistance typically within the range of 2000 to 6000 ohms per foot. The Goss carbon fiber heating element is positioned between and parallel to two axially elongate parallel electrical conductors which are electrically connected at axially spaced apart intervals by axially transverse electrically conductive splices and provides the parallel electrical connections to the carbon fiber heating element therebetween.

It is Applicant's contention that the electrical conductors or splices 26, 26 of Goss are essential parts of the Goss heating element assembly, since these conducting splices are essential to the provision of multiple parallel connections to the heating element 20 which provide the zones necessary to attain constant wattage in the heating cable. The conductors 26, 26 do not render the heating cable of Goss suitable for use as general electrical transmission cable. Otherwise stated, the electrical conductors 24, 24 are provided for the sole purpose of supplying parallel electrical power to the high resistance heating element 20 to maintain constant wattage in the zones defined by the transverse electrically conductive splices 26, 26.

Reference is now made to page 3, paragraph 7 of the present Office Action where the basis for the rejection under 35 USC §103 (a) is set forth.

It is the Examiner's position that it would have been obvious to one having ordinary skill in the art to modify Inagaki's invention to include a carbon fiber heating element as taught by Goss in order to make the flat heating cable more durable. The flat heating cable to which the Examiner refers is actually the electrical transmission cable of Inagaki which is very clearly defined in the '586 patent specification as an electrical cable used e.g. for wiring public utility apparatus, office automation apparatus, electronic parts mounted in vehicles, and the like, as previous set forth.

It is Applicant's contention that there is no motivation for modifying the Inagaki invention to include a carbon fiber heating element as taught by Goss. The Examiner's position is based upon a fallacious assumption by the Examiner that Inagaki, et al. discloses a heating cable having a heating element 5. The Action makes repeated reference to the "heating element 5". The Inagaki specification is quite clear and defines the elements 5 as conductor elements. The Inagaki specification contains no reference to a heating cable or heating elements 5 such as found in the present Action.

Applicant contends that one having ordinary skill in the art at the time the present invention was made would have a level of skill in the art sufficient to enable appreciation of the difference between an electrical transmission cable (Inagaki '586) for use in electrical wiring to freely transmit or convey electrical current and an electrical resistance heating cable (Goss '059) for transforming electrical energy into heat energy. The Inagaki cable and the Goss cable are at opposite ends of the electrical cable spectrum. One is the antithesis of the other.

In the Summary of the Invention of the Goss patent, Goss states that the heating cable of the present invention has a heating element comprised of carbon, graphite, or other non-metallic, conductive filament and has a high tensile strength and can withstand repeated thermal cycling without exhibiting physical or electrical damage. The term high tensile strength is a relative one and is not supported by any data. In analytical data is provided by Goss to support only the reduction of thermal stress induced in the cables.

There is nothing in the Goss patent to suggest how the heating element of Goss might be used to modify the electrical transmission cable of the Inagaki. The only apparent suggestion for the modification of the invention of Inagaki in accordance with the teachings of Goss is the suggestion made by the Examiner

found in paragraph 7 of the present Office Action. The only support of the suggestions appears to be the Examiner's opinion that the Inagaki reference discloses a heating cable having a "heating element 5".

Assuming, for the purpose of argument, that the flat electrical transmission cable of Inagaki, et al. is modified "to include a carbon fiber heating element as taught by Goss in order to make the flat heating cable (the Inagaki cable) more durable", there is nothing offered in the Action to support the contention that modification of the Inagaki cable will improve the durability of the cable.

If the carbon fiber heating element of Goss is to function as a heating element in the hypothetical modifying cable of the primary reference Inagaki then the modification will have altered the operational principal of the primary reference, which is clearly intended to be simply a electrical transmission cable. Where are proposed modification changes or otherwise alters the operational principal of the reference being modified the teachings derived from the references are not sufficient to render the claims prima facie obvious.

Further assuming, for the purpose of argument, in the alternative that the carbon fiber element of the secondary reference Goss, et al. are carried forward into the primary reference leaving behind the heating function of the carbon fiber element so that the carbon fiber element functions only as a physical strengthening device to improve the durability of the primary reference, then there is a failure to consider the teachings of the secondary reference as a whole, in violation of 103(a) and the prima facie case of obviousness must fail for this reason.

Since all of the base claims, i.e., claims 1, 26, 27, and 35 are rejected under 35 USC §103(a) as unpatentable over Inagaki, et al. '586 in view of Goss, et al. '059. All of the arguments directed to the allowance of claim 1 apply with equal force to the remaining base claims and it is unnecessary to submit individual arguments regarding the remaining subordinate claims. However, since all of the subordinate claims are rejected under 35 USC §103(a) as unpatentable over Inagaki in view of Goss, et al. and further in view of McMahon, et al. (6,045,906) and Sundaraj et al (6,610,773) some comments regarding the McMahon and reference seem to be in order.

As the title to the McMahon patent suggests, the McMahon invention relates to processes for preparing fibers useful in forming or molding composite articles and more particularly relates to carbon fiber tows containing fiber blends, which are useful in preparing such composite articles (see McMahon, column 1, Background of

the Invention). In the present Office Action, paragraph 8, page 4, it is stated "McMahon discloses separate webs (Figs. 1-2) and thermal plastic material for "the sheath" comprising polyester (column 2, lines 63-67) and Kapton (column 14, lines 24-39)".

McMahon does not disclose separate webs in Figs. 1 and 2. Further, McMahon does not disclose a "sheath" as stated in paragraph 3 on page 4 of the present Office Action. The ABSTRACT and the SUMMARY OF INVENTION clearly state what is shown in Figs. 1 and 2 of McMahon, namely a process for making an intermixed tow which starts with a tow and ends with a tow. Clearly, no webs or sheath are shown or described. In fact, one cannot find the word "web" or "webs" or the words sheath at any point in the McMahon patent, although such structures are present in the invention sought to be patented. While the quoted statement from paragraph 3, page 4 of the present Office Action may be attributed to a mere careless use of words by the examiner, it works out to be a misrepresentation of that which is disclosed in Figs. 1 and 2 of the McMahon patent, which brings the cited reference into closer alignment with the invention sought to be patented. Actually, the tows produced in accordance with the McMahon patent are used to make composite molded articles which is abundantly clear from the title of the patent and the disclosed subject matter, when considered as a whole.

The prior art reference Sundararaj et al 6,610,773, when properly considered as a whole or in its entirety, teaches polyetherimide resin compositions having a conductive filler material such as carbon fiber, preferably having a diameter of about one to about twenty microns for making components such as computer chip trays and disk-shaped parts made by molding processes.

In the Office Action dated January 26, 2005, at page 3, paragraph 8, it is stated:

Sundararaj discloses a carbon fiber with a diameter of 7 micron and a resistance of 15000 ohm per square cm (Table 1). It would have been obvious to one having ordinary skill in the art to modify the invention of Inagaki in view of Goss to use a bundle of carbon fibers, separate webs, polyester a Kapon as taught by McMahon and a diameter and a resistance of the fiber as taught by Sundararaj in order to make the carbon heating element more durable.


The carbon fibers of Sundararaj (Table 1) available from Akzo, Diameter 7 micron, length 1/8 inch are filler materials for a resin molding material and not at all suitable for use in a heating cable, such as the cable of Goss.

Further it is Applicant's contention that the Examiner is employing hindsight to reconstruct Applicant's invention using Applicant's disclosure as a blue print for the reconstruction.

For the aforesaid reason, a prima facie case for obviousness has not been established. Accordingly, and in the absence of more pertinent art, it is respectfully submitted that all of the claims presently under consideration should be allowed.

A check in the amount of \$120.00 is included herewith to cover the fee for a one month extension of time or to file this response. Please charge any deficiency in the fee for entering this amendment to Deposit Account No. 13-0235.

Respectfully submitted,

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